WHAT IS CLAIMED IS:

1. An optical information recording and reproducing apparatus which records information by emitting a laser beam modulated according to recording data to a recording medium, comprising:

a laser light source which emits a laser beam to a recording medium;

a recording pulse generator which generates recording pulse signals to modulate optical intensity of the laser light source according to recording data;

a laser driver which drives said laser light source according to the recording pulse signals;

a photodetector which detects the laser beam emitted by said laser light source;

a sampler which samples an output signal of said photodetector; and

a sampling timing generator which generates a sampling timing to instruct sampling to said sampler;

wherein said sampling timing generator generates a sampling timing delayed at least by a response time of a propagation path including said laser driver, said laser light source and said photodetector.

2. The optical information recording and reproducing apparatus according to claim 1, wherein said sampling timing generator generates a sampling timing for a record mark having a length longer than a sum of a settling time of a signal propagating the propagation path and a necessary acquisition time and a necessary aperture time of said sampler.

3. The optical information recording and reproducing apparatus according to claim 1, further comprising a laser power controller which controls power of said laser light source according to an output signal of said sampler.

4. The optical information recording and reproducing apparatus according to claim 1, further comprising a voltage monitor device which monitors power supply voltage of at least one of said laser driver, said laser light source, said photodetector and said sampler, wherein said sampling timing generator changes a sampling timing according to the power supply voltage monitored by said voltage monitor device.

5. The optical information recording and reproducing apparatus according to claim 1, further comprising a temperature monitor device which monitors temperature of at least one of said laser driver, said laser light source, said photodetector and said sampler, wherein said sampling timing generator changes a sampling timing according to the temperature monitored by said temperature monitor device.

6. The optical information recording and reproducing apparatus according to claim 1, further comprising a test pulse generator which outputs a test pulse signal to said laser driver, and a measurement unit which measures response time of a test pulse signal until the test pulse signal propagates through the propagation path and is detected by said sampler as a sampled signal, wherein said sample timing generator determines a sampling time according to the response time measured by said measurement unit.

7. An optical information recording and reproducing apparatus which records information by emitting a laser beam modulated according to recording data to a recording medium, comprising:

a laser light source which emits a laser beam to a recording medium;

a recording pulse generator which generates recording pulse signals to modulate optical intensity of said laser light source according to recording data;

a laser driver which drives said laser light source according to the recording pulse signals;

a photodetector which detects the laser beam emitted by said laser light source and reflected by a recording medium;

a sampler which samples an output signal of said detector; and

a sampling timing generator which generates a sampling timing to instruct sampling to said sampler;

wherein said sampling timing generator generates a sampling timing delayed at least by a response time of a propagation path including said laser driver, said laser light source and said photodetector.

8. The optical information recording and reproducing apparatus according to claim 7, wherein said sampling timing generator generates a sampling timing for a record mark having a length longer than a sum of a settling time of a signal propagating the propagation path and a necessary acquisition time and a necessary aperture time of said sampler.

9. The optical information recording and reproducing apparatus according to claim 7, wherein said sampling timing generator changes a sampling timing according to a type of the recording medium.

10. The optical information recording and reproducing apparatus according to claim 7, further comprising a laser power controller which controls

power of said laser light source according to an output signal of said sampler.

11. The optical information recording and reproducing apparatus according to claim 7, further comprising a servo error detector which provides a servo error signal by using an output signal of said sampler, and a servo device which converges the laser beam to a track in the recording medium by using the servo error signal.

12. The optical information recording and reproducing apparatus according to claim 7, further comprising a recording clock reproducing device which reproduces recording clock signals by using an output signal of said sampler.

13. The optical information recording and reproducing apparatus according to claim 7, further comprising a voltage monitor device which monitors power supply voltage of at least one of said laser driver, said laser light source, said photodetector and said sampler, wherein said sampling timing generator changes a sampling timing according to the power supply voltage monitored by said voltage monitor device.

14. The optical information recording and reproducing apparatus according to claim 7, further comprising a temperature monitor device which monitors temperature of at least one of said laser driver, said laser light source, said photodetector and said sampler, wherein said sampling timing generator changes a sampling timing according to the temperature monitored by said temperature monitor device.

15. The optical information recording and reproducing apparatus according to claim 7, further comprising a test pulse generator which outputs a test pulse signal to said laser driver, and a measurement unit which measures

response time of a test pulse signal until the test pulse signal propagates through the propagation path and is detected by said sampler as a sampled signal, wherein said sample timing generator determines a sampling time according to the response time measured by said measurement unit.

16. An optical information recording and reproducing apparatus which records information by emitting a laser beam modulated according to recording data to a recording medium having pits formed as address information for managing data position, comprising:

a laser light source which emits a laser beam to a track in a recording medium for recording data;

a recording pulse generator which generates recording pulse signals to modulate optical intensity of said laser light source according to the recording data on recording;

a laser driver which drives said laser light source according to the recording pulse signals;

a photodetector which detects the laser beam emitted by said laser light source and reflected by the recording medium;

a first binarizer which binarizes an output signal of said photodetector with a first slicing level;

a second binarizer which binarizes an output signal of said photodetector with a second slicing level;

a selector which selects one of a first output signal of said first binarizer and a second output signal of said second binarizer;

a selection signal generator which generates a selection signal to instruct said selector which of the first and second output signals; and

a reproducing device which reproduces address information by using an output signal of said selector;

wherein said selection signal generator generates a timing of the selection signal according to response time of a propagation path including said laser driver, said laser light source, said photodetector, and said first and second binarizers.

17. The optical information recording and reproducing apparatus according to claim 16, further comprising a voltage monitor device which monitors power supply voltage of at least one of said laser driver, said laser light source, said photodetector, said first and second binarizers and said selector, wherein said sampling timing generator changes a timing of the selection signal according to the power supply voltage monitored by said voltage monitor device.

18. The optical information recording and reproducing apparatus according to claim 16, further comprising a temperature monitor device which monitors temperature of at least one of said laser driver, said laser light source, said photodetector, said first and second binarizers and said selector, wherein said sampling timing generator changes a timing of the selection signal according to the temperature monitored by said temperature monitor device.

19. A method of optical information recording by emitting a laser beam by a laser light source to a recording medium, the laser beam having intensity modulated according to recording data, the method comprising the steps of:

applying a recording pulse to the laser light source to emit a pulse light beam according to the recording pulse;

detecting light quantity of the emitted pulse light beam;

sample-and-holding the detected light quantity according to a sampling pulse to detect optical intensity of the laser beam;

wherein the timing of the sampling pulse is delayed at least by response time of a recording pulse in a propagation path from application of the recording pulse until just before sample-and-holding it, and the timing is generated for a recording mark having a length longer than a sum of a necessary acquisition time and a necessary aperture time for sampling.

20. The method according to claim 19, wherein a following relationship is satisfied:

$$tx > Td + Ts,$$

wherein tx denotes time between application of the recording pulse and start of the sampling timing, Td denotes delay time on forming a recording mark, and Ts denotes settling time of the propagation path.

21. The method according to claim 18, wherein a following relationship is satisfied:

$$n > \{Ts + Tw + Ta\}*f,$$

wherein n denotes shortest length of recording mark or space for which the sampling pulse is outputted, Ts denotes settling time of the propagation path, Tw denotes width of sampling pulse, and Ta denotes aperture time on sample-and-holding, and f denoted recording frequency.

22. A method of optical information recording by emitting a laser beam by a laser light source to a recording medium, the laser beam having intensity modulated according to recording data, the method comprising the steps of:

applying a recording pulse to the laser light source to emit a pulse light beam to the recording medium according to the recording pulse;

detecting light quantity of the pulse light beam reflected from the recording medium;

sample-and-holding the detected light quantity according to a sampling pulse to detect optical intensity of the laser beam;

wherein the timing of the sampling pulse is delayed at least by response time of a recording pulse in a propagation path from application of the recording pulse until just before sample-and-holding it, and the timing is generated for a recording mark having a length longer than a sum of a necessary acquisition time and a necessary aperture time for sampling.

23. The method according to claim 22, wherein a following relationship is satisfied:

$$ty > \{Td + (Ts2 + Tm2)1/2\},$$

wherein ty denotes time between application of the recording pulse and start of the sampling timing, Td denotes delay time on forming a recording mark, and Ts denotes settling time of the propagation path.

24. The method according to claim 22, wherein a following relationship is satisfied:

$$m > \{(Ts2 + Tm2)1/2 + Tw + Ta\}*f,$$

wherein m denotes shortest length of recording mark or space for which the sampling pulse is outputted, Ts denotes settling time of the propagation path, Tm denotes delay time on forming a recording mark, Tw denotes width of sampling pulse, Ta denotes aperture time on sample-and-holding, and f denoted recording frequency.

25. The method according to claim 22, wherein the timing of the sampling pulse is changed according to a type of the recording medium.